

CLAIMS

1. An image pickup apparatus characterized by comprising:
an image pickup device for picking up an image of a
subject;
5 a signal processing section for generating a composite
image having a relatively wider dynamic range than at least
either the dynamic ranges of a long-time exposure image picked
up with a relatively long exposure time by said image pickup
device or a short-time exposure image picked up with a
10 relatively short exposure time by said image pickup device,
by synthesizing said long-time exposure image and said
short-time exposure image; and
a control section for compressing said composite image
and dynamically varying the assignment proportion of a high
15 luminance dynamic range to a low-middle luminance dynamic
range in a dynamic range of an output image to be outputted
as a video signal.
2. An image pickup apparatus according to claim 1,
20 characterized in that said control section dynamically varies
said assignment proportion of said high luminance dynamic
range to said low-middle luminance dynamic range according
to at least a luminance region which occupies said composite
image.
- 25 3. An image pickup apparatus according to claim 1,
characterized in that said control section corrects said
assignment proportion of said high luminance dynamic range
to said low-middle luminance dynamic range each time said
30 composite image is generated.

4. An image pickup apparatus according to claim 3, characterized in that said luminance region is at least either a high luminance region or a low-middle luminance region.
- 5 5. An image pickup apparatus according to claim 1, characterized in that said control section dynamically varies said assignment proportion of said high luminance dynamic range to said low-middle luminance dynamic range according to at least an average luminance signal level of said high
10 luminance region which occupies said composite image.
6. An image pickup apparatus according to claim 1, characterized in that said control section dynamically varies said assignment proportion of said high luminance dynamic
15 range to said low-middle luminance dynamic range according to at least an average luminance signal level of said low-middle luminance region which occupies said composite image.
- 20 7. An image pickup apparatus according to claim 1, characterized in that said control section dynamically varies said assignment proportion of said high luminance dynamic range to said low-middle luminance dynamic range according to at least said high luminance region which occupies said
25 composite image.
8. An image pickup apparatus according to claim 1, characterized in that said control section dynamically varies said assignment proportion of said high luminance dynamic
30 range to said low-middle luminance dynamic range according to at least said low-middle luminance region which occupies

said composite image.

9. An image pickup apparatus according to claim 8,
characterized in that said control section at least
5 monotonically varies said assignment proportion of said high
luminance dynamic range to said low-middle luminance dynamic
range.

10. An image pickup apparatus characterized by comprising:
10 an image pickup device for picking up an image of a
subject;

a signal processing section for generating a composite
image having a relatively wider dynamic range than the dynamic
range of at least either a long-time exposure image picked
15 up with a relatively long exposure time by said image pickup
device or a short-time exposure image picked up with a
relatively short exposure time by said image pickup device,
by synthesizing said long-time exposure image and said
short-time exposure image; and

20 a control section for compressing said composite image
and dynamically assigning the dynamic range of said composite
image to the dynamic range of an output image to be outputted
as a video signal.

25 11. An image pickup apparatus according to claim 10,
characterized in that said control section dynamically
assigns the dynamic range of said composite image to the
dynamic range of said output image according to at least a
luminance region which occupies said composite image.

30 12. An image pickup apparatus according to claim 10,

characterized in that said control section dynamically assigns the dynamic range of said composite image to the dynamic range of said output image each time said composite image is generated.

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13. An image pickup apparatus according to claim 10, characterized in that said control section dynamically assigns the dynamic range of said composite image to the dynamic range of said output image according to at least a
10 high luminance region which occupies said composite image.

14. An image pickup apparatus according to claim 10, characterized in that said control section dynamically assigns the dynamic range of said composite image to the
15 dynamic range of said output image according to at least an average luminance signal level of said high luminance region which occupies said composite image.

15. An image pickup apparatus according to claim 10, characterized in that said dynamic range is at least either
20 a high luminance dynamic range or a low-middle luminance dynamic range.

16. An image pickup apparatus according to claim 15, characterized in that said control section dynamically assigns assignment of at least either said high luminance dynamic range or said low-middle luminance dynamic range of
25 said output image according to said high luminance region which occupies said composite image.

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17. An image pickup apparatus according to claim 15,

characterized in that said control section dynamically assigns assignment of at least either said high luminance dynamic range or said low-middle luminance dynamic range of said output image according to said high luminance region
5 which occupies said composite image.

18. An image pickup apparatus according to claim 15, characterized in that said control section dynamically assigns a section of said high luminance dynamic range of said
10 output image to said low-middle luminance dynamic range according to at least a decrease of said high luminance region which occupies said composite image.

19. An image pickup apparatus according to claim 15,
15 characterized in that said control section dynamically assigns a section of said high luminance dynamic range of said output image to said low-middle luminance dynamic range according to at least a decrease of an average luminance signal level of said high luminance region which occupies said
20 composite image.

20. An image pickup apparatus according to claim 15, characterized in that said control section dynamically assigns a section of said low-middle luminance dynamic range
25 of said output image to said high luminance dynamic range according to at least an increase of said high luminance region which occupies said composite image.

21. An image pickup apparatus according to claim 15,
30 characterized in that said control section dynamically assigns a section of said low-middle luminance dynamic range

of said output image to said high luminance dynamic range according to at least an increase of an average luminance signal level of said high luminance region which occupies said composite image.

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22. An image pickup apparatus according to claim 21, characterized in that said control section at least monotonically varies the assignment proportion of said high luminance dynamic range to said low-middle luminance dynamic range of the said output image.

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23. An image pickup apparatus characterized by comprising:
an image pickup device for picking up an image of a subject;

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a detection section for detecting an image signal of a long-time exposure image picked up with a relatively long exposure time by said image pickup device, and an image signal of a short-time exposure image picked up with a relatively short exposure time by said image pickup device;

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a synthesis section for generating a composite image from said long-time exposure image and said short-time exposure image on the basis of a switch luminance signal level determined from said image signals;

a control section for compressing said composite image according to a luminance region which occupies said composite image, and dynamically assigning the dynamic range of an output image to be outputted as a video signal; and

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a compression section for compressing the dynamic range of said composite image on the basis of dynamic assignment of said dynamic range of said output image.

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24. An image pickup apparatus according to claim 23, characterized in that said luminance region is at either a high luminance region or a low-middle luminance region.

5 25. An image pickup apparatus according to claim 23, characterized in that said synthesis section acquires, from said short-time exposure image, said pixels corresponding to at least a higher luminance signal level than said switch luminance signal level among pixels constructed in said
10 composite image.

26. An image pickup apparatus according to claim 23 characterized in that said synthesis section acquires, from said long-time exposure image, said pixels corresponding to
15 at least a lower luminance signal level than said switch luminance signal level among said pixels constructed in said composite image.

27. An image pickup apparatus according to claim 23,
20 characterized in that said dynamic range is at least either a high luminance dynamic range or a low-middle luminance dynamic range.

28. An image pickup apparatus according to claim 23,
25 characterized in that said control section determines a compression gain for compressing a luminance signal level of said composite image on the basis of at least the assignment proportion of a high luminance dynamic range of said output image to a low-middle luminance dynamic range thereof.

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29. An image pickup apparatus according to claim 23,

characterized in that said control section determines at least a high luminance compression gain for compressing a luminance signal level of said high luminance region in said composite image and a low-middle luminance compression gain
5 for compressing a luminance signal level of said low-middle luminance region.

30. An image pickup apparatus according to claim 23, characterized in that said control section further includes
10 a compression gain calculation section for determining, for each luminance signal level of said composite image, at least either a final high luminance compression gain or a final low-middle luminance compression gain which are to be used by said compression section, on the basis of at least either
15 said high luminance compression gain or said low-middle luminance compression gain.

31. An image pickup apparatus according to claim 23, characterized in that said control section dynamically varies
20 an assignment proportion between said high luminance dynamic range and said low-middle luminance dynamic range of said output image according to at least said high luminance region which occupies said composite image.

25 32. An image pickup apparatus according to claim 31, characterized in that said control section at least monotonically varies the assignment proportion of said high luminance dynamic range to said low-middle luminance dynamic range of said output image.

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33. An image pickup apparatus characterized by comprising:

an image pickup device for picking up an image of a subject;

5 a detection section for detecting an image signal of a long-time exposure image picked up with a relatively long exposure time by said image pickup device, and an image signal of a short-time exposure image picked up with a relatively short exposure time by said image pickup device;

10 a synthesis section for excluding said luminance signal level from a target to be synthesized, when at least said image signal corresponding to a luminance signal level of either said long-time exposure image or said short-time exposure image is absent, and synthesizing said long-time exposure image and said short-time exposure image on the basis of said switch luminance signal level;

15 a control section which dynamically assigns the dynamic range of an output image to be outputted as a video signal in which a composite image is compressed, according to a luminance region which occupies said composite image in which said long-time exposure image and said short-time exposure image are synthesized; and
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a compression section for compressing the dynamic range of said composite image on the basis of dynamic assignment of said dynamic range of said output image.

25 34. An image pickup apparatus according to claim 33, characterized in that said synthesis section selects said luminance signal level lower than said switch luminance signal level in said long-time exposure image, as a target for said composite image.

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35. An image pickup apparatus according to claim 33,

characterized in that said synthesis section selects said luminance signal level higher than said switch luminance signal level in said short-time exposure image, as a target for said composite image.

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36. An image pickup apparatus according to claim 33, characterized in that said luminance region is at least either a high luminance region or a low-middle luminance region.

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37. An image pickup apparatus according to claim 33, characterized in that said dynamic range is at least either a high luminance dynamic range or a low-middle luminance dynamic range.

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38. An image pickup apparatus according to claim 33, characterized in that said control section dynamically varies the assignment proportion of said high luminance dynamic range to said low-middle luminance dynamic range of said output image according to at least a high luminance region

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which occupies said composite image.